REMARKS

The applicants thank the Examiner for the thorough examination of the application. No new matter is believed to be added to the application by this Amendment.

Status Of The Claims

Claims 1 and 4-16 are pending in the application. Claims 2 and 3 are cancelled. Claim 1 has been amended to incorporate the subject matter of cancelled claim 2. Claims 5-8 and 14 have been amended to improve their antecedent basis, and the amendments to these claims are not directed at overcoming a rejection. Claim 16 corresponds to claim 1 and cancelled claim 2.

Rejections Over Funakoshi

Claims 1-8 and 11-15 are rejected under 35 U.S.C. §102(a) as being anticipated by Funakoshi (WO 02/085634, as analyzed via U.S. 2004/0115370). Claims 1-15 are rejected under 35 U.S.C. §103(a) as being obvious over the single reference of Funakoshi. Applicants traverse.

The Present Invention And Its Advantages

The present invention pertains to a novel ink-jet recording material that has good ink absorption while showing few coating defects. Although the

present invention has many embodiments, a typical embodiment can be found in claim 1:

> 1. (Currently Amended) An ink-jet recording material comprising
> a support, and
> at least one porous ink-receptive layer containing inorganic fine particles and polyvinyl alcohol provided as a main component of a binder on the support,
> wherein the inorganic fine particles are fine particles in which wet process silica is pulverized to have an average secondary particle size of 400 nm or less, and at least one of said ink-receptive layers contains a polymer emulsion containing a polymer compound which shows a hydrophilic property at a temperature region of a predetermined temperature, which is a thermosensitive temperature, or less and shows a hydrophobic property at a temperature region higher than the thermosensitive temperature in an amount of 1 to 25% by weight based on the amount of the polyvinyl alcohol in terms of a solid content.

The ink-jet recording material of the present invention has a porous ink-receptive layer containing inorganic fine particles that are wet process silica prepared by pulverizing to have an average secondary particle size of 400 nm or less. By using these inorganic fine particles in the porous ink-receptive layer, an ink-jet recording material having photo-like high gloss, excellent ink absorption and high productivity can be obtained (see Specification at page 31, lines 1-4).

The "high productivity" of the present invention means improving the handling property of a coating solution by preventing the irreversible gelation that is believed to be caused by the interaction between a thermosensitive latex

and inorganic fine particles. This effect is discussed in the specification at page 2, line 20 to page 3, line 6, and at page 11, lines 11-27.

Distinctions Of The Invention Over Funakoshi

Funakoshi pertains to polymer emulsion mixed with silica fine particles that tends to irreversibly gel when coated. Funakoshi was discussed in the specification at page 2, line 20 to page 3, line 6. Funakoshi fails to disclose or suggest using a wet process silica that is pulverized to have an average secondary particle size of 400 nm or less.

Funakoshi at paragraphs [0110] to [0112] and [0140] to [0143] (U.S. 2004/0115370) discusses colloidal silica, dry method silica, alumina sol or a pseudo-boehmite type of alumina fine particles. In contrast, the present invention uses fine particles in which "wet process silica is pulverized to have an average secondary particle size of 400 nm or less," as is set forth in claim 1. The materials described in Funakoshi are fundamentally different from the present invention's wet process silica having an average secondary particle size of 400 nm or less.

Colloidal silica is described in the specification as a silica obtained by heating and ripening silica sol obtained by metathesis of sodium silicate with an acid or by passing through an ion exchange layer (*see* specification at page 4, lines 29-35). That is, these are not silica fine particles that are mechanically pulverized.

The "wet process silica" set forth in claim 1 of the present invention is described at page 4, lines 5 to 35 of the specification. "Wet process silica" can be classified into a precipitation method silica, a gel method silica and a sol method silica in accordance with their preparation methods. The terms include silica prepared by either of the processes discussed above. However, the silica recited in claim 1 of the present invention ("fine particles in which wet process silica is pulverized to have an average secondary particle size of 400 nm or less") is mechanically pulverized wet processed silica, but is not colloidal silica.

As a result, Funakoshi clearly fails to anticipate the present invention.

Moreover, the colloidal silica obtained by heating and ripening a silica sol has spherical particles, and this material is incapable of providing sufficient ink absorption properties. In contrast, Funakoshi is oblivious to this aspect of the technology. Funakoshi in paragraph [0110] states "The type of colloidal silica is not particularly limited . . . The type of fumed silica is not particularly limited." Funakoshi in paragraph [0111] further states that "it is preferable to use alumina sol and a pseudo-boehmite type alumina fine particle as a fine particle . . ." Therefore, Funakoshi teaches away from the advantages that can be gained from using a wet process silica having a secondary particle size of 400 nm or less.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). A *prima facie* case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997).

Also, the Examiner utilizes the single reference of Funakoshi to allege *prima facie* obviousness.

To establish a *prima facie* case of obviousness, "the prior art reference (or references when combined) must teach or suggest all the claim limitations." *MPEP §2143.* In addition, if a reference needs to be modified to achieve the claimed invention "there must be a showing of a suggestion or motivation to modify the teachings of that reference to the claimed invention in order to support the obviousness conclusion." *Sibia Neurosciences Inc. v. Cadus Pharmaceutical Corp.*, 225 F.3d 1349, 55 USPQ2d 1927 (Fed. Cir. 2000). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

In asserting obviousness over claims 1-15 in paragraph 2 of the Office Action, the Examiner offers no rationale but posits the blanket assertion: "While the claims set forth above are anticipated by the reference, the reference is also considered to obviate these claims." The Examiner then turns to claims 9 and 10 of the present invention:

> With respect to claims 9 and 10, it is ***well known in the art*** to cross-link a hydrophilic resin binder in order to increase the strength and water resistance of the ink receptive layer. Boric acid, borax and borates are ***well known*** for this purpose. It would have been obvious to one of ordinary skill in the art to cross-link the polyvinyl alcohol with a conventional binder in order to increase strength and water resistance of the ink receptive layer. (Emphases added)

However, the Examiner fails to point out where in the single reference of Funakoshi itself (or anywhere in the prior art) this teaching or suggestion can be found.

Therefore, Funakoshi fails to anticipate the present invention. One having ordinary skill in the art would not be motivated by the single reference of Funakoshi to produce a claimed embodiment of the present invention. A *prima facie* case of obviousness has thus not been made.

Further, the present invention shows unexpected results that would rebut any obviousness that could be alleged.

The present invention improves coating defects, white portion glossiness, ink-absorption and gelation reversibility of an ink-jet recording material having

a porous ink-receptive layer. These results are clearly shown in Table 1 at page 30 of the specification, where the present invention uses wet process silica pulverized to have an average secondary particle size of 400 nm or less and polyvinyl alcohol as a main binder.

In the Examples in Table 1, recording sheets 1 to 5 were prepared using silica dispersion 1, which was prepared from precipitated silica that was treated with a bead mill while in suspension. Recording sheets 6 to 9 were prepared using silica dispersion 2, which was prepared from fumed silica in a homogenized suspension. The present invention's recording sheet 3 (bead mill treated silica, i.e., wet processed) had a coating defect rating of "O," which means no coating defect and the coated surface was uniform. In comparison, recording sheet 6 (homogenized fumed silica) had a rating of "Δ," which means that pale coating strips occurred partially. As a result, it is clearly advantageous to use wet process silica pulverized to have an average secondary particle size of 400 nm or less and polyvinyl alcohol as a main binder.

These rejections are overcome and withdrawal thereof is respectfully requested.

Foreign Priority

The Examiner has acknowledged foreign priority and indicated that certified copies of the priority documents have been received in the Office Action mailed May 5, 2005.

Conclusion

The Examiner's rejections have been overcome, obviated or rendered moot. No issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No. 42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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